

Photo: Solarpraxis AG/Jonathan Gifford



Activ Solar's 42.95 MW Starokozache power plant was constructed over a 10-month period.

Growth in the shadow of Chernobyl

Ukraine: Eastern European PV markets have been characterized by boom and bust of the worst kind – like that seen in the Czech Republic – and a sometimes agonizing wait for policy, as is the case in Poland. However, in Ukraine the development of PV power plants has been consistent, demonstrated solid growth, and appears to have paid off for market-leading project developer Activ Solar. **pv magazine** headed to Kiev and Ukraine to find out more.

At over 2,600 km², the Chernobyl exclusion zone is a vast and permanent reminder of the dangers of nuclear energy and a testament to how, when a reactor gets out of control, the implications are horrendous and the costs almost incalculable. But while the term 'exclusion zone' may conjure up images of a nuclear wasteland, the reality is very different. The vast wooded landscape that makes up the zone has now been rewilded with fauna that had long vanished from the landscape, and a workforce of thousands tend to the forestry, water, ongoing nuclear cleanup and maintenance services still required. The life and activity within the exclusion zone is striking.

In another sense, the scars – both economic and psychological – on the Ukrainian people from the 1986 Chernobyl reactor four meltdown remain deep, and the issue of electricity supply a sensitive one. For PV park integrators and the solar industry, this sensitivity and Cher-

nobyl's place in the national psyche present both a challenge and an opportunity.

"This is a key point," says Activ Solar, Inc. CEO Kaveh Ertefai, meeting with **pv magazine** at an upmarket Kiev hotel. "There is a fundamental need for these (PV) projects in the Ukraine." Ertefai says that Ukraine still relies on nuclear power for around 50% of electricity generation, with the remainder coming from gas-fired sources. Like nuclear, electricity supply from gas is not straightforward: gas is a strategically sensitive energy source in Ukraine, with the often difficult relationship with Russia exposing the country's gas supply to temporary shortages and tense negotiations over supply agreements.

PV Ukraine

Given these energy dynamics, Ukraine has been turning to renewable energy in recent years. In August 2010, Viktor Yanukovich, then the Ukrainian pres-

ident, said the construction of wind and PV power plants will be among the nation's 10 high priority national projects. Ukraine has committed to the EU goal of sourcing 20% of its electricity generation from renewable sources by 2020. With generally high DNI, at least from a European perspective, solar is proving to be in the right place to prosper from these goals and this public policy approach.

Ukraine's Green Tariff legislation was enacted in 2009, enacting a generous FIT of €0.46/kWh (\$0.62/kWh) for solar installations along with a condition requiring utilities to connect renewable energy facilities to the grid. The Green Tariff legislation has locked in FITs until 2030 and secures utility off-take during that period. A further incentive for renewable energy comes in the form of a VAT exemption for equipment imported for renewable energy power plants, provided that equipment is manufactured outside of Ukraine.

Since the Green Tariff legislation came into effect, Activ Solar has clearly emerged as one of the market leaders in developing PV projects in Ukraine. Renewable energy consultancy Aprium GmbH believes the company has captured around 75% of the PV project market share in the country, developing around 470 MW of projects and possessing a large team there.

While dominant, the Austrian firm is not alone in the Ukrainian PV market. The European-Ukrainian Energy Agency reported in late 2011 that local firm Rentechno LLC, Germany's Managess Energy GmbH, Israel's Sun Electra and Schneider Electric Israel Ltd were all develop-

Photo: Solarpraxis AG/Jonathan Gifford



A new sarcophagus will cover the destroyed Chernobyl reactor four, adding to the already massive costs incurred in attempts at making the site safe.

ing projects in Ukraine. Semiconductor materials suppliers Pillar CJSC, Prolog LLC and Silicon LLC are also present in the country – although the European-Ukrainian Energy Agency notes that due to a lack of domestic polysilicon manufacturing, companies import silicon scrap as a raw material.

While clearly spurring the appetite for PV, the long shadow cast by the Chernobyl disaster adds a layer of complication to project development. Activ Solar reports that this has been true while it developed its projects. “We often get asked crazy questions about PV,” says Ertefai, “because many of the people in this country have not seen these [PV] projects and how they work.” To counter this, the company has engaged local

communities in the often rural areas next to its PV plants. School groups visit the installations and learn about solar PV technology, dispelling any fears about living near a PV installation.

Market entry

Activ Solar was founded in Vienna in 2008 and the company’s directory states it is 100% owned by Liechtenstein P&A Corporate Trust Fund. Besides this, the company is reticent to reveal further details regarding investors, yet Austrian media reports indicate Christian Dries, CEO of aircraft manufacturer Diamond Aircraft, owns a controlling interest in Activ Solar. One of the first things Activ Solar did as a company was to move into Ukraine, with the purchase of the PJSC

Semiconductor Plant in Zaporozhye, in 2008. The plant dates back to the Soviet era, having been constructed in 1964 when Ukraine was a major polysilicon manufacturer. Activ Solar undertook a €300 million modernization of the facility with the first batch of silicon being produced in October, 2010. The PJSC fab has a production capacity of 22,000 metric tons (mt) of trichlorosilane (TCS) and 2,200 mt of polysilicon annually and employs 1,300 people.

The PJSC investment was a crucial step in Activ Solar’s successful growth in Ukraine, sending an important signal to the government that the company was serious in its commitment to doing business there, and wouldn’t be exploiting generous FITs, only to cut and run. “Through that whole process we became very familiar with the investment climate and opportunities here, and being closer to the authorities was deemed essential,” says Ertefai.

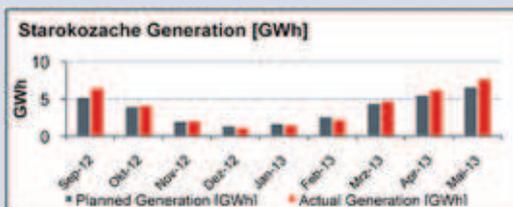
A key government relationship was established by Activ Solar in Crimea, once the Green Tariff was passed, with bipartisan support, by Ukraine’s parliament in 2009. Work on a 7.5 MW pilot project on the Crimean peninsula began shortly afterwards saw an MOU signed by Activ Solar with the Crimean local government for up to 1 GW of PV power plants.

In addition to its good DNI, Crimea presents an excellent opportunity for PV with around 95% of its electricity supplied from vast nuclear power plants in the country’s north. Crimea’s electricity must often be carried along aging electricity infrastructure, leading to losses Activ Solar estimates at around 40%.

Job creation through PV project development has also been an aspect Activ Solar has been keen to emphasize. Instead of relying on imported Austrian staff for project development – the ‘suitcase model’ – Activ has built a project team of around 300 staff in the southern Odessa and Crimea regions, with around 3,000 local contracts tapped for additional construction services.

Ongoing jobs are created in operations and maintenance roles and in particular in providing plant security. Local police are employed as subcontractors to oversee security at the power plants, a practice Grigoriy Ustenko, project manager for the Odessa region, says is commonplace in Ukraine.

i OPERATIONS AND MAINTENANCE IN UKRAINE



“The most powerful tool we have is the rain to wash the panels,” says Activ Solar’s Grigoriy Ustenko, the company’s Odessa region project manager, at the Starokozache power plant.

Mounted at a 30 degree angle, snowfalls in winter also help keep modules clean. Domestic string timers are used to keep grass down at the Starokozache plant, however on at least one site in Crimea, Activ Solar has had to use tractor-mounted

cutting equipment to keep hardy bushes at bay. For the monitoring of park performance, third party software is used and monitored both on-site and remotely. Site managers are also employed at the Activ Solar power plants, overseeing park performance and maintenance, facilitating visits from local schoolchildren and coordinating the security details. With comparatively low wages in Ukraine, Activ Solar keeps O&M services in house.

Starokozache power plant

When visiting the 42.95 MW Starokozache power plant outside Odessa, **pv magazine** was struck by the lengths taken to ensure security at the park. Large electrified fencing was employed and at any time three or four security guards were in position with dogs at four points around the park. “The people contracted for the job are local,” says Ustenko, it’s good for them because often they don’t have any other job.” Local goat herders pass by the Starokozache plant daily and the fences are as much about protecting the PV equipment from their hungry mouths as it is from theft, says Ustenko. In spite of this, the gruff project manager does admit that there were attempts at equipment theft at the site during the construction phase.

The Starokozache plant covers 80 hectares of arable land, previously used as a tractor driver training facility. Construction took 10 months and equipment for the plant came from Asian (modules) and German (mounting systems, inverters) suppliers. Some 183,694 crystalline modules were used in the installation with the plant built in two stages, each around 20 MW. Ukrainian subcontractors were used for the construction and project manager Ustenko reports seeing contractors on-site from as far away as Kiev and Crimea. A purpose-built substation is only meters from the installation and stands in stark contrast to some of the drab Soviet-era grid infrastructure.

A cosy relationship?

Grid connection of renewable energy installations is required under Ukraine’s Green Tariff legislation, but the gleaming Starokozache substation prompts the suspicion that very close relationships with government and officials is required in Ukraine to develop projects. Certainly Ertetai admits working through bureaucratic processes has taken time.

Journalists from Ukrainian newspaper *Ukrayinska Pravda* have levelled accusations of impropriety at Activ Solar, tracing financial links between the company and family members of senior government officials. The company released a statement rejecting any malpractice took place, which in part reads: “As we cooperate with a wide range of global investors in our solar park business, we are regularly screened and have to meet international business standards.”

Keys to success

The success that Activ Solar has enjoyed in Ukraine is clear. Generating revenues of just over €500 million in 2012, the company plans to use the expertise it has built up to launch into the U.S. and the MENA region in the near future. Certainly Activ Solar’s experience in securing project financing in emerging PV markets is apparent, having raised over €1.2 billion for PV projects since 2009. In Ukraine, Activ typically takes a 30 – 40% equity stake in PV power plants.

Having developed strong local project development teams in Ukraine, Activ Solar says it has no plans to exit the market any time soon. However, recent FIT reductions may sharpen the company’s international focus. Activ Solar says it intends to partner with local technical and financial partners in its expansion into new markets, particularly the MENA region and the U.S., and the company is in the final stages of JV negotiations in Saudi Arabia. In the States, where it is focused on developing projects on the West Coast, Activ Solar has intimated a new project announcement is expected in the coming months.

The company’s Lichtenstein trust ownership structure is also intended to facilitate equity investment in the company to secure future growth. CEO Ertetai indicates the company will “eventually move” in the direction of becoming a publicly listed company.

In terms of its Ukrainian business, Matthias Kittler, a principal with Apricum Consulting, says that by understanding the importance of being local and acting early, the firm has set an example for others looking for success in emerging PV markets. “Solar is a local business,” says Kittler, “when you want to develop a project you really have to know how to deal with government. If you start early, speak the language, are on the ground, establish a footprint, and especially if it’s mandatory – as it is in the Ukraine – to establish projects using local content, then you are well positioned.”

Ukraine outlook

Apricum’s Kittler says the outlook for the solar market in Ukraine is good, given the underlying dynamic of rising fossil fuel costs and solar’s increasing competitiveness. A currently non-existent commercial or residential rooftop market could also develop over time. While

INVESTMENT GUIDE: UKRAINE

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PV has enjoyed strong government support to date, however, regulatory changes could trip up the industry. “I think that’s one of the biggest concerns we see,” says Kittler. “PV development in Ukraine is really driven by the FIT and there is a likelihood that the government will revise policies. Already we see that in some regions of the country there is tension that there might be too much wind and solar power in the grid.” Activ Solar’s Ertetai agrees that grid capacity may be a constraining factor in the future.

Ukraine’s Green Tariff legislation has already undergone a major change this year. Solar FITs were reduced by 27% for new ground-mounted installations, operational from April 1. Ground-mounted installations now receive €0.31/kWh. As a part of the legislation, large-scale rooftop installation FITs were also reduced, but measures facilitating small-scale rooftop PV were introduced. The 30% domestic content requirement under the legislation remained and will rise to 50% next year. On top of that there was the additional requirement modules must be manufactured from at least 30% of Ukrainian raw materials, also rising to 50% in 2014. Imepower Group, a Ukrainian energy advisory, observed this brought uncertainty and that “the majority of solar developers put their projects on hold to assess the options for solar PV modules and their respective EPC packages, which comply with the new local content requirement.”

These moves will undoubtedly increase the costs of developing PV parks in the country and reduce investor returns. At the same time, a little over 100 km outside the country’s capital Kiev, construction of a new sarcophagus to contain the fallout from Chernobyl’s reactor number four continues. The sarcophagus is estimated to cost around €1.7 billion and work at the site will continue for years. In light of this, PV may begin to be seen as one of the safest, most secure and low-cost energy sources for Ukraine’s future. ♦

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